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(54) Vial-containing box, formed from a single punched cardboard sheet

(57) The invention provides a box for housing and retaining injection vials, bottles and the like (60) in a stable and protected position, the box being formed from a single punched sheet of cardboard or the like provided with holes (31,32) and being easily usable, foldable and closable by the common machines normally used for making up and closing boxes of known structure.

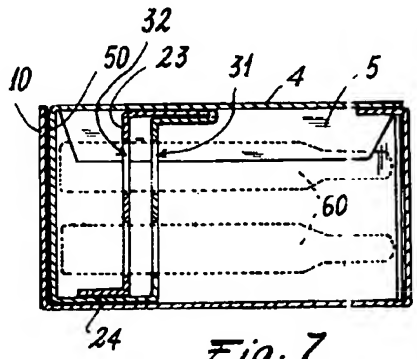

Fig. 7

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Description

This invention relates to a box for containing vials, bottles and the like, the box being formed from a single sheet of punched and perforated cardboard or the like. The invention also relates to the single punched and perforated sheet for forming the box.

Glass vials containing injectable liquids are housed and retained in suitable trays which are inserted into boxes (usually constructed of punched cardboard), the base of which has been previously closed. The box lid is then closed.

The firms inserting such vials possess automatic machines which preform the boxes by giving them the traditional parallelepiped shape and then close their base (very often by gluing this base into the closed position) while leaving one end or the lid of the box open. A separate machine then distributes and positions the vials (in the predetermined required number) in shaped trays (usually constructed of plastics material or punched and folded sheets of cardboard) which keep the vials spaced apart to prevent their breakage, given that they are usually fragile. The trays and vials are then inserted into the preformed boxes by automatic machines, after which the box lid is closed.

As will be apparent, all these operations are rather laborious and costly, both because they require the use of trays and because they require a relatively long time for their completion.

The main object of the present invention is to provide a very economical box which can be preformed and finally closed at high speed using machines of traditional type after the required predetermined number of vials have been inserted into the box, the vials being housed and retained in preformed housings or seats automatically provided in the box during its preforming.

A further object is to provide a box of the stated type in which the vials can be securely retained spaced from each other and from the lateral walls of the box, to reduce the risk of breakage after their packaging.

These and further objects are attained by a box formed from a single punched sheet of cardboard or flexible material and comprising:

- four consecutive main panels separated from each other by first parallel folding lines, and a fixing tab projecting from one of said main panels and separated from it by a folding line also parallel to the first folding lines,
- at least one closure panel projecting from at least one first main panel, from which it is separated by a second folding line substantially perpendicular to said first folding lines, at least one of the closure panels being flat and fixable by gluing into the box formed from the sheet,
- flaps projecting from a second and from a third main panel, between these latter there being interposed another of the main panels of the sheet, said flaps being rotatable about third folding lines which are also perpendicular to the first folding lines,

characterised in that from the fourth main panel and from the same side of the sheet as that from which a closure panel fixable by gluing projects, there projects an elongate strip of said flexible material of width substantially equal to the width of said fourth panel and separated from it by a fourth folding line which is also perpendicular to the first folding lines, said strip being divided into at least seven parts by at least six folding lines parallel to said fourth folding line, the first part of the strip projecting directly from the fourth main panel and being separated from the third part by an intermediate part or second part, the third part being separated from the sixth part by two other intermediate parts, ie by a fourth and by a fifth part which are consecutive, and finally a terminal seventh part projecting from said sixth part, in the third and sixth part there being provided holes intended to lie aligned in pairs within the box when formed from the sheet of flexible material, the length of said first, third and sixth part being substantially equal to the width of said second and third main panel, the intermediate fifth part of said strip having a length greater than that of the intermediate fourth part.

The structure and characteristics of the box will be more apparent from the description of a preferred embodiment thereof given hereinafter by way of non-limiting example with reference to the accompanying drawings, in which:

Figure 1 is a plan view of a punched and perforated cardboard sheet usable for forming the box;
Figures 2 to 4 show the cardboard sheet in various successive stages of folding and gluing by the box production firm;
Figures 5 and 6 show the box in two different stages of preforming by the box user firm; and
Figures 7 and 8 are respectively a longitudinal section and a cross-section through the box in its closed state already containing the vials, which are shown by dashed lines.

The punched and perforated cardboard sheet usable for forming the box is shown in Figure 1.

It comprises four consecutive main panels 1, 2, 3, 4 and a fixing tab 5, which are separated from each other by first parallel folding lines 6, 7, 8, 9.

From the panel 1 there project a flat closure panel 10 (separated from it by a second folding line 11) and a panel 12 (separated by a folding line 13) with a foldable tab 14 intended to form a traditional closure lid for the box.

Flaps 15 project from the panels 2 and 3, and are separated from the respective main panels by third folding lines 16.

The folding lines 11, 13 and 16 are perpendicular to the folding lines 6-9.

From the main panel 4 (and from that side of the sheet from which the flat panel 10 projects) there projects an elongate strip of width substantially equal to the width of the panel 4 and separated therefrom by a fourth folding line 17, the strip being divided into seven parts 18, 19, 20, 21, 22, 23, 24 by folding lines 25, 26, 27, 28, 29 parallel to each other and to the line 17 and all perpendicular to the folding lines 6-9.

The first, third and sixth strip part 18, 20, 23 have a length (in the longitudinal direction of the strip) substantially equal to the width of the panels 2 and 3. The strip parts 20 and 23 comprise holes 31 and 32 which lie aligned in pairs within the finished box, as explained hereinafter.

It can be seen that the strip part 22 is longer than the part 21 and the part 24 is shorter than the part 19.

The cut and punched cardboard sheet shown in Figure 1 is directly prepared by the box manufacturer who then, in a second processing step, applies layers of glue indicated by dots to the strip parts 19, 21, 22, 24. Having done this, the strip is folded about the folding line 28 and the parts 22 and 24 are superposed on the parts 21 and 19 respectively (Figure 2), so gluing them together.

To the outside of the strip part 22 and/or to the inside of the wall 4 there are then applied a layer of glue 40 and/or 41, after which the cardboard strip is further folded about the line 25 to fix the glued outer surface 40 of the part 22 to the inner surface of the wall 4 (Figure 3) (by means of the said glue).

At this point the fixing tab 5 is folded inwards and a layer of glue 42 applied to it (Figure 3), after which the cardboard is folded about the line 7 to fix the glued edge of the tab 5 to the free end of the wall 2 (Figure 4).

All the aforesaid operations can be effected very simply by the box manufacturer, who delivers the boxes to the final user in their folded and flattened state as shown in Figure 4, in which the panels 3 and 4 are substantially mutually coplanar and are superposed on the panels 1 and 2.

The box user firm positions the packs of folded boxes (shown in Figure 4) on normal automatic machines which exert a pressure on the opposing corners of the box, which hence assumes the appearance shown in Figure 5, with the panels 2 and 3 perpendicular to the panels 1 and 4. The flaps 15 and the elongate strip part 18 are then automatically rotated towards the interior of the box. This rotation of the part 18 causes the parts 20 and 23 to rotate, these hence automatically assuming the position shown in Figure 7 in which they are mutually parallel and spaced apart, with the holes 31 of the part 20 aligned with the holes 32 of the part 23.

A layer of glue 50 is then applied to the interior of the panel 10, which is then rotated to become superposed on and glued onto the outer surface of the strip part 18 (Figures 6 and 7).

All the aforedescribed operations effected by the box user are carried out using common machines used for making up boxes with a glued base.

At this point the vials 60 are inserted into the box through its open lid and remain securely housed and retained in the pairs of holes in the strip parts 20 and 23. It is important to note that the vials are kept spaced from the lateral walls of the box, ie from the panels 1-4, so preventing breakage of the vials, which are most fragile precisely at their sides.

The lid can then be closed and the boxes stored and marketed.

It should be noted that because of the presence of the strip parts within the box, this acquires considerable rigidity and the operations involved in packaging the vials are extremely simple, quick and economical, with evident advantages.

Claims

1. A sheet of punched flexible material for forming boxes for containing vials, bottles and the like, comprising:

   - four consecutive main panels separated from each other by first parallel folding lines, and a fixing tab projecting from one of said main panels and separated from it by a folding line also parallel to the first folding lines,
   - at least one closure panel projecting from at least one first main panel from which it is separated by a second folding line substantially perpendicular to said first folding lines, at least one of the closure panels being flat and fixable by gluing into the box formed from the sheet,
   - flaps projecting from a second and from a third main panel, between these latter there being interposed another of the main panels of the sheet, said flaps being rotatable about third folding lines which are also perpendicular to the first folding lines,

   characterised in that from the fourth main panel and from the same side of the sheet as that from which a closure panel fixable by gluing projects, there projects an elongate strip of said flexible material of width substantially equal to the width of said fourth panel and separated from it by a fourth folding line which is also perpendicular to the first folding lines, said strip being divided into at least seven parts by at least six folding lines parallel to said fourth folding line, the first part of the strip projecting directly from the fourth main panel and being separated from the third part by an intermediate part or second part, the third part being separated from the sixth part by two other intermediate parts, ie by a fourth and by a fifth part which are consecutive, and finally a terminal seventh part projecting from said sixth part, in the third and sixth part there being provided holes intended to lie aligned in pairs within the box when formed from the sheet of flexible

material, the length of said first, third and sixth part being substantially equal to the width of said second and third main panel, the intermediate fifth part of said strip having a length greater than that of the intermediate fourth part.

2. A box for containing vials, bottles or the like, formed from a single sheet of punched flexible material as defined in claim 1.

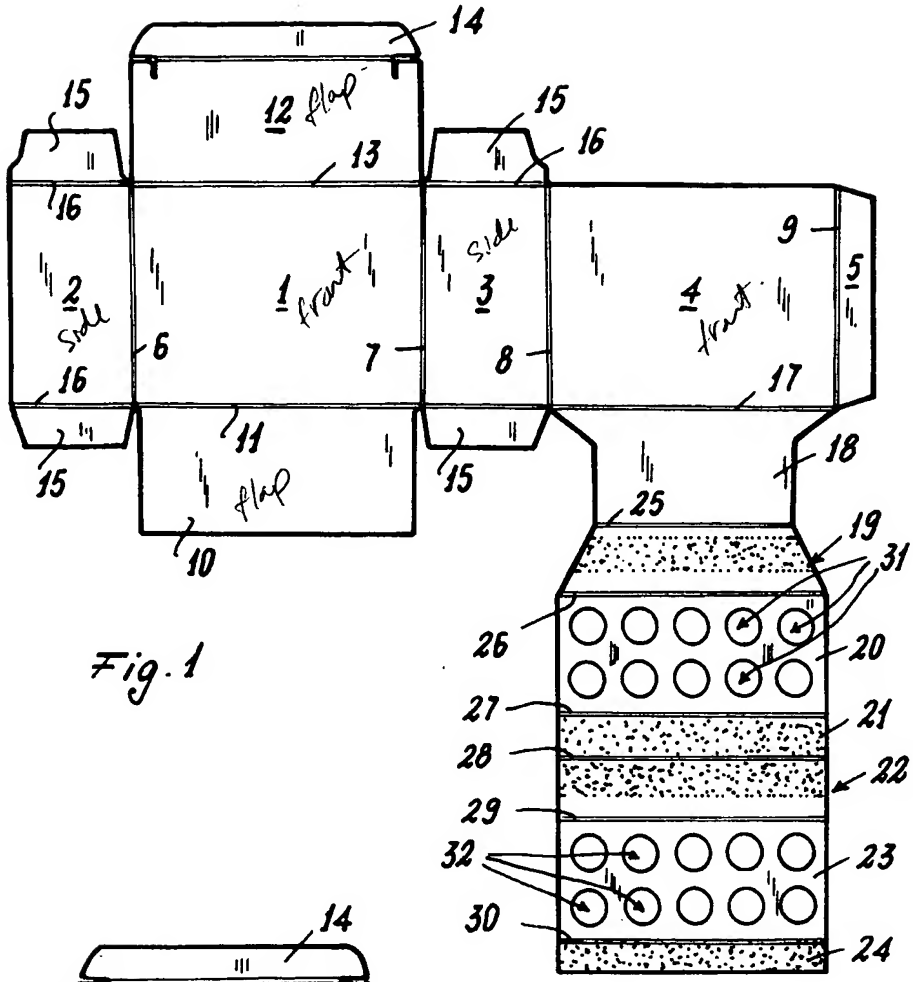

Fig. 1

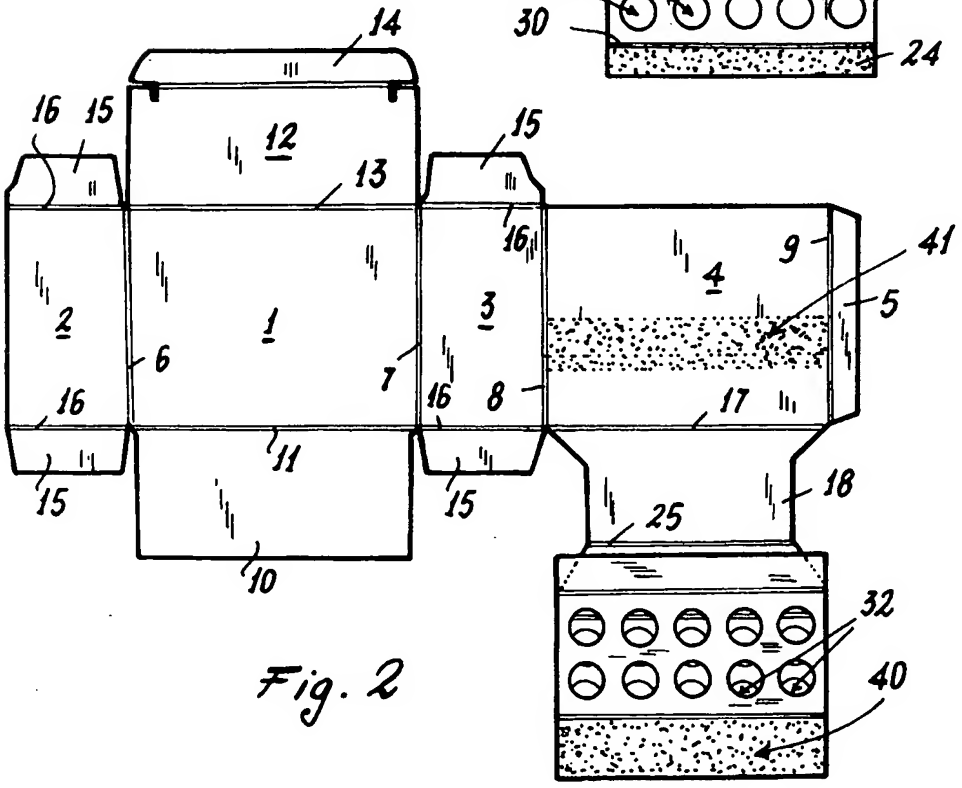

Fig. 2

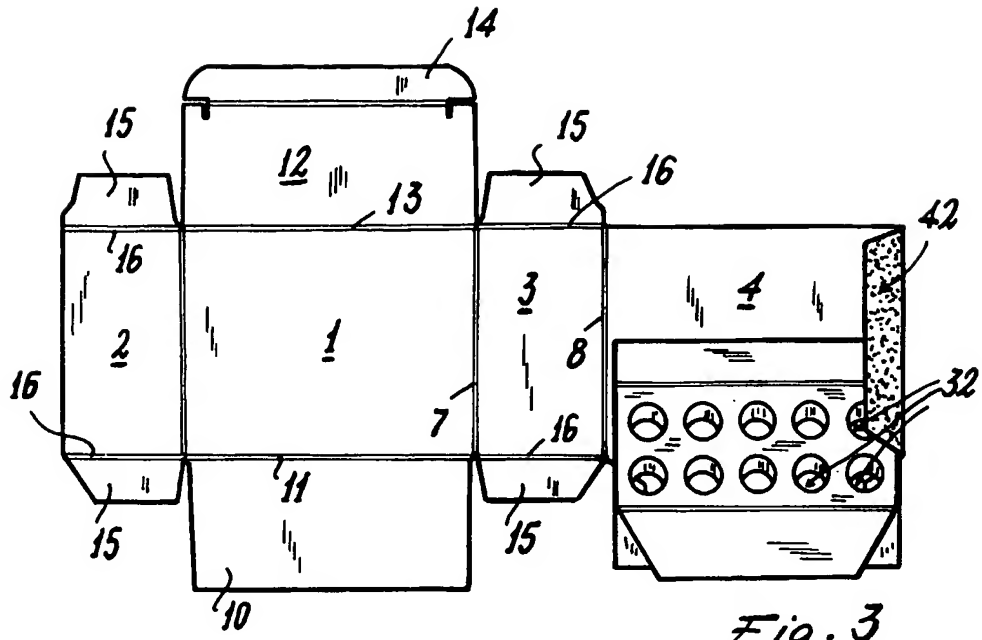

Fig. 3

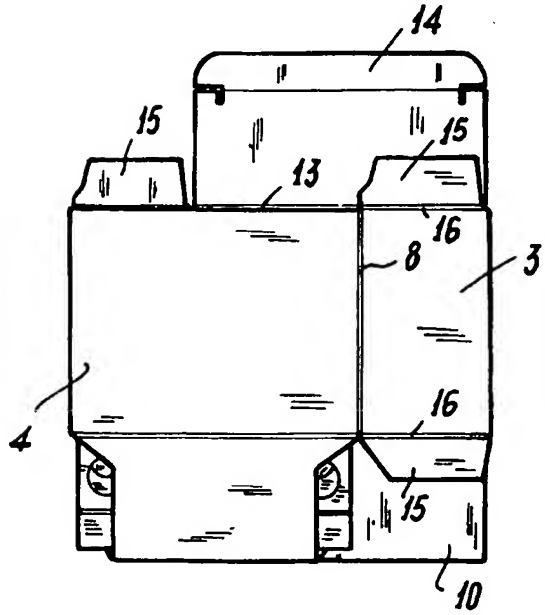

Fig. 4

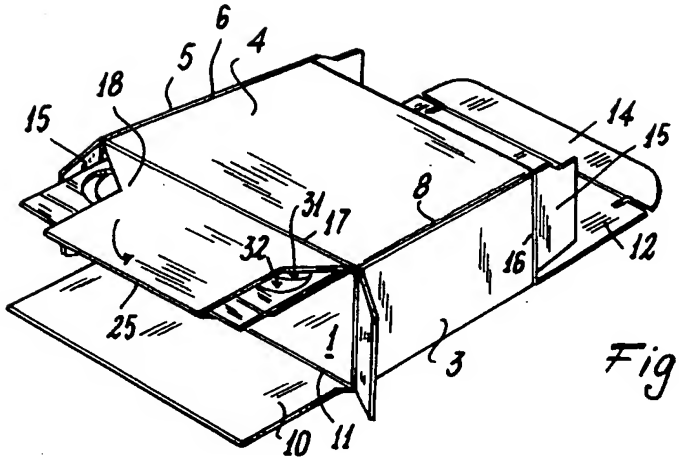

Fig. 5

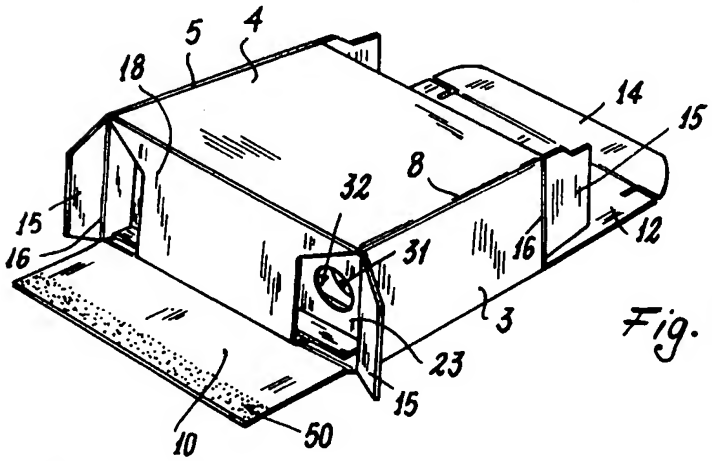

Fig. 6

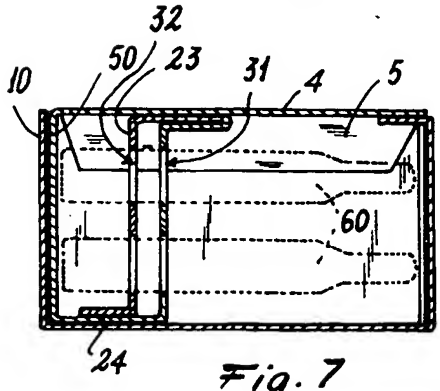

Fig. 7

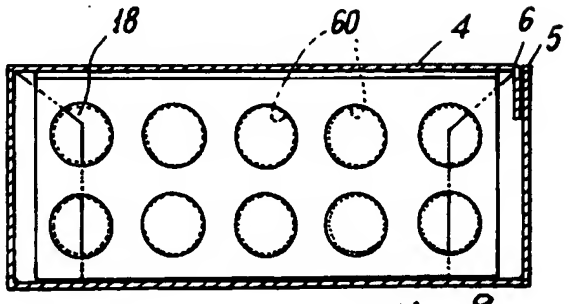

Fig. 8

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EUROPEAN SEARCH REPORT

Application Number
EP 96 10 0339

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	DE-A-43 09 036 (BOSCH GMBH ROBERT) 22 September 1994 * the whole document * ---	1,2	B65D5/50
A	DE-A-24 53 309 (EDELMANN CARL GMBH) 20 May 1976 * figures * -----	1,2	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	12 June 1996	Spettel, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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